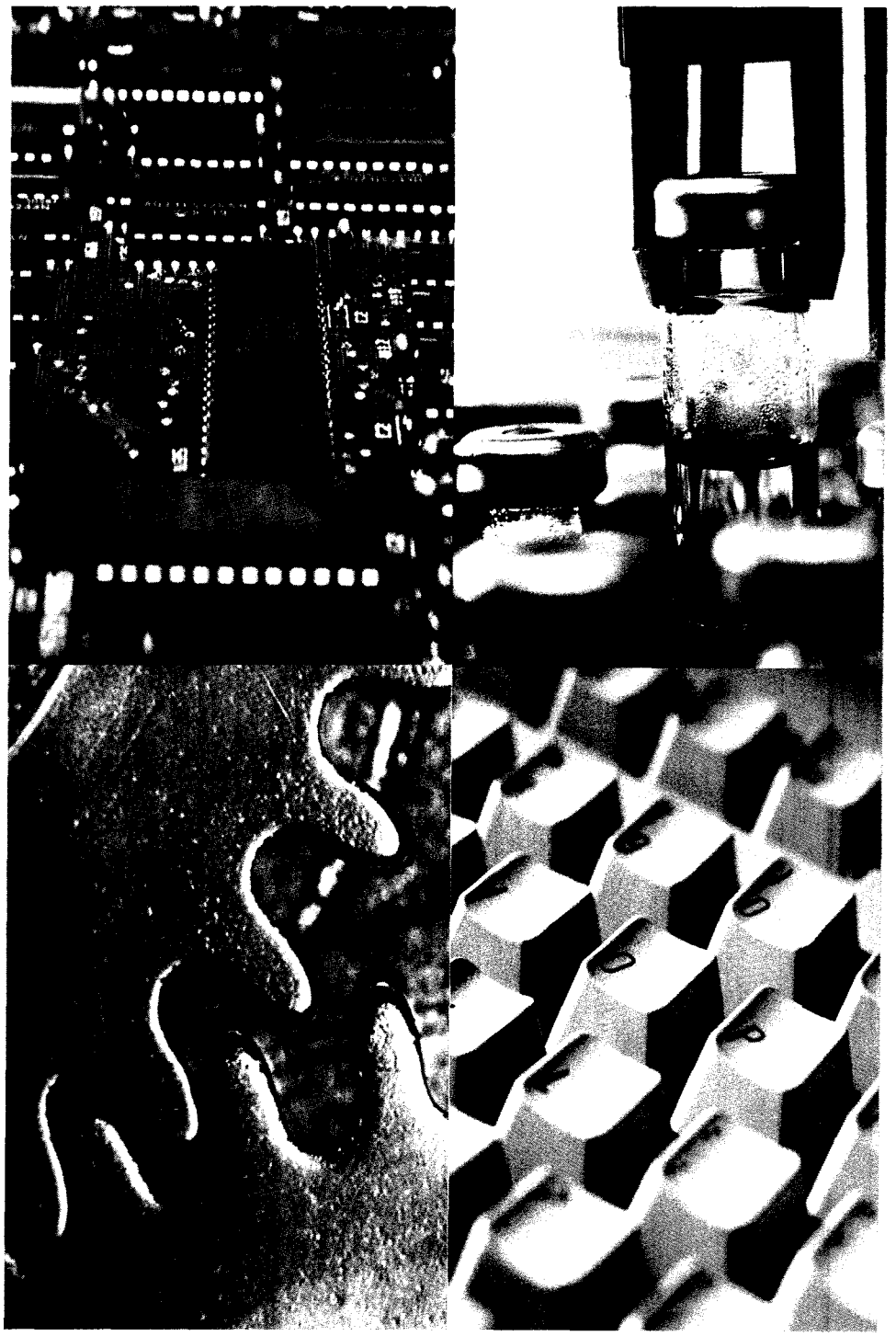
Modicon
J810/J812 Remote I/O Adapter
Installation and Operation Guide

PI-J810-002 Rev. C



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Modicon J810/J812 Remote I/O Adapter Installation and Operation Guide

PI–J810–002 Rev. C

November, 1991

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Subject

Instructions for installing and operating the J810/J812 Remote I/O Adapter for use with a 584 or 984 Programmable Controller and 800 Series I/O Modules.

July, 1989

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Preface

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Modicon	184	584L
Micro 84	384	884
Modbus	484	984
Modvue	584	P180
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This guide contains instructions for installing and operating the J810/J812 Remote I/O Adapter to allow remote I/O communications to exist between a 584 or 984 Programmable Controller and 800 Series I/O. Chapter 1 is an introduction to the remote I/O system. Chapter 2 covers system description. Chapter 3 provides instructions for configuring the system. Chapter 4 contains installation instructions. Chapter 5 details confidence tests. Appendix A lists the error codes and their definitions. Appendix B is a specifications table. Appendix C contains a configuration procedure.

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List of Related Publications

Use the following publications in conjunction with this guide:

ML-584A-000	584 Programmable Controller User's Manual
ML-A584-USE	584 Programmable Controller ASCII Programming Guide
ML-584R-USE	584 Programmable Controller Remote I/O Processing Guide
PI-584B-001	584 Programmable Controller Remote I/O Installation and Troubleshooting Guide
PI-584M-001	584M Programmable Controller System Planning and Installation Guide
PI-584L-001	584L Programmable Controller System Planning and Installation Guide
PI-884A-002	884 Programmable Controller System Planning and Installation Guide
PI-984A-004	984 Programmable Controller Programming Guide
PI-984A-003	984 Programmable Controller System Planning and Installation Guide

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Chapter 1
Introduction

This chapter provides an introduction to the J810/J812 subsystem of a 584 or 984 Programmable Controller system. The features of the systems are listed.

The J810/J812 Remote I/O Adapter is designed to allow remote I/O communications between a 584 or 984 Programmable Controller and 800 Series I/O modules. This provides the capabilities of a large controller with the advantages of the compact and easy-to-install 800 Series I/O modules which can go in either rack- or panel-mounted housings.

The 584/800 and 984/800 Remote I/O Systems feature the following:

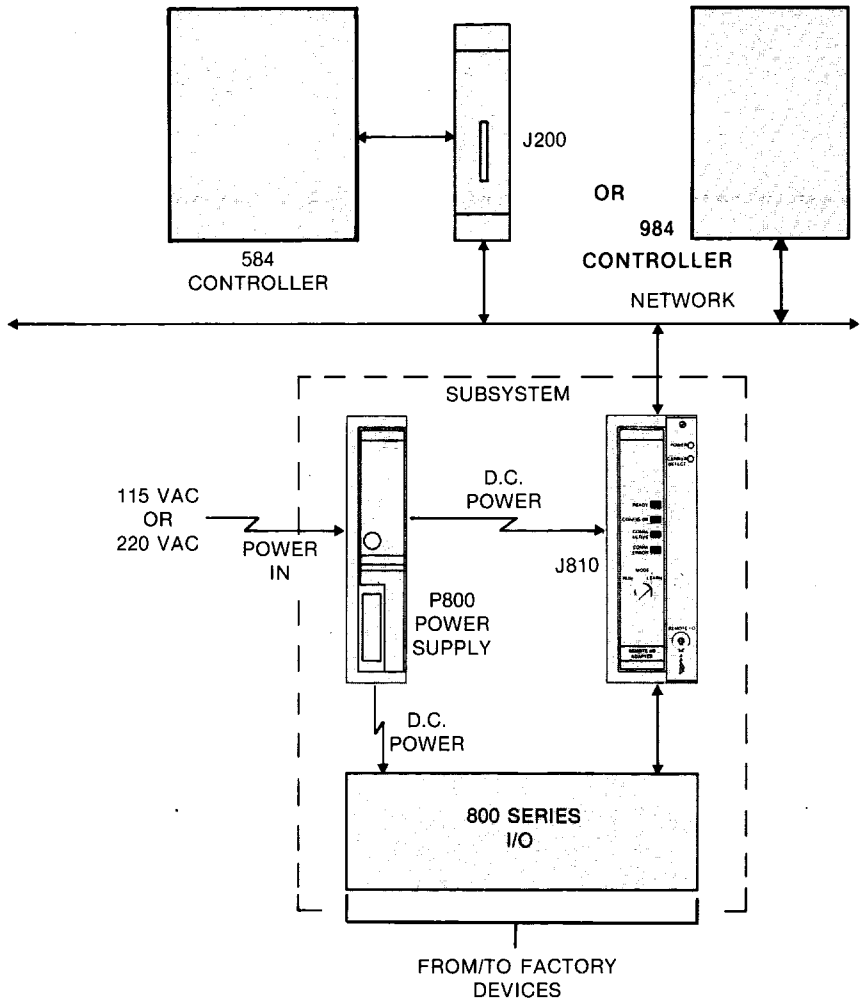
- The 800 Series I/O has a higher density than 200 Series I/O normally used with the 584 Controller.
- Each J810/J812 supports 256 input points and 256 output points.
- The J810/J812 and the P800 Power Supply plug directly into an 800 Series mainframe housing, providing an integrated package.
- The drop address is selected by setting the switches in the J810/J812 Adapter.
- LED/Error indicators on the front panel of the adapter indicate certain J810/J812 status when on; if flashing, they indicate a hardware failure.
- The controller communications timeout period is selectable: 300 or 1200 milliseconds. This allows support of the 584/J211 redundancy system, as applicable.
- The J810/J812 executes confidence tests on power-up and in repeat and single-step test modes.
- The J810/J812 executes on-line confidence tests.
- The J810/J812 Adapter can be added to an existing 584 PC system with no software changes to the 584 Controller or other drops on the line.
- The 584 or 984 Controller can also use 200 Series I/O modules simultaneously, at a different drop. The 984 Controller can use 500 Series I/O as well.
- The J810/J812 periodically samples configured I/O modules, providing the most recent data from the input modules and the most recent health information for input and output modules.

Chapter 2
System Description

A description of the components of the 584/800 and 984/800 remote I/O systems is in this chapter along with the titles and publication part numbers for all related manuals.

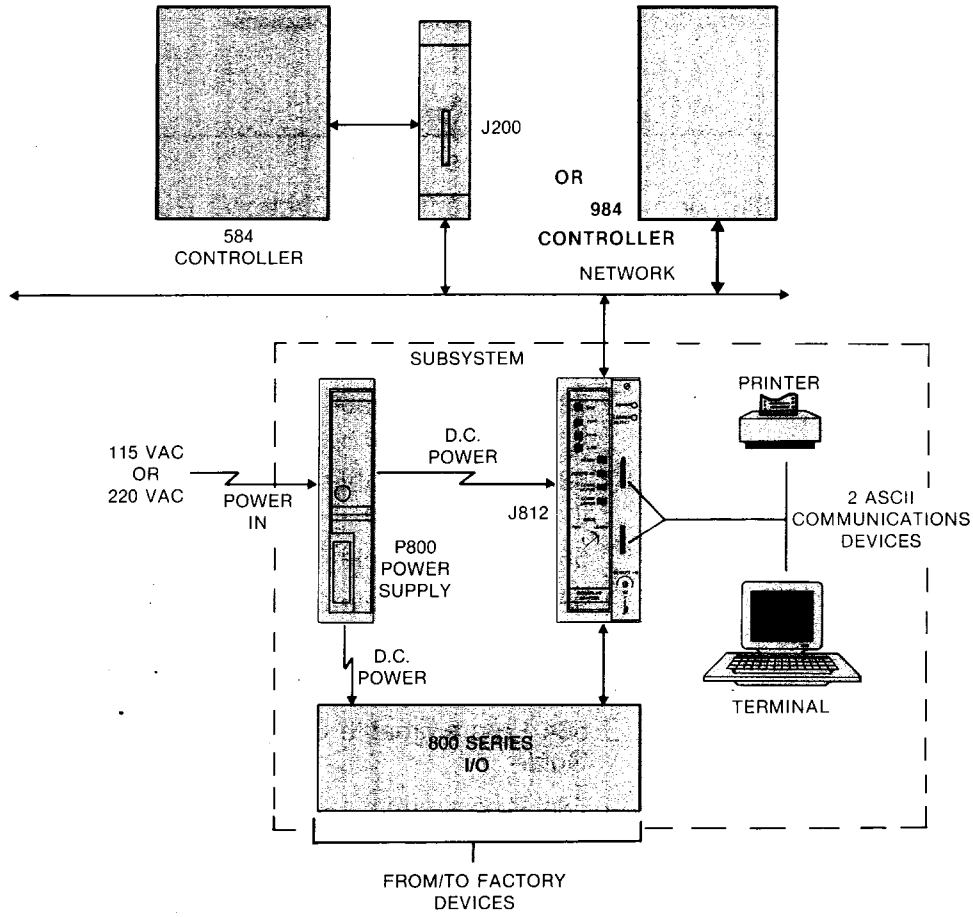
The Modicon J810/J812 Remote I/O Adapter allows a 584 or 984 Programmable Controller to use 800 series I/O. Each 584 or 984 Programmable Controller (PC) system can drive up to 16 remote I/O drops. The J810/J812 Adapter Module is the interface between the 584 or 984 system and the 800 series I/O. Figure 2-1 illustrates the components of the J810 based subsystem or remote I/O drop.

Figure 2-1
J810 Subsystem



The J812 Adapter Module has the same functions as the J810 and also supports two ASCII communication ports. This allows terminals, printers, and other peripherals to be added to the system. Figure 2-2 shows the J812 subsystem or remote I/O drop components.

Figure 2-2
J812 Subsystem



As shown in Figures 2-1 and 2-2, the J810/J812 is the adapting interface between the controller and the I/O. The 584 or 984 PC communicates with remotely located I/O drops through a coaxial cable network. The subsystem address and supported I/O configuration are identified by switch settings in the J810/J812.

The subsystem components are listed in Table 2-1 with corresponding publication names and part numbers.

Table 2-1 Subsystem Components and Corresponding Publications

Equipment	Publication Name	Publication Part Number
584A, 584M, 584L, or 984 Programmable Controller	Select One ☐	
	☐ 584 Programmable Controller Remote I/O Processing Guide	ML-584R-USE
	☐ 584 Programmable Controller Remote I/O Installation and Troubleshooting Guide	PI-584B-001
	Select One ☐	
	☐ 584M Programmable Controller System Planning and Installation Guide	PI-584M-001
	☐ 584L Programmable Controller System Planning and Installation Guide	PI-584L-001
	☐ 584 Programmable Controller User's Manual	ML-584A-000
	☐ 984 Programmable Controller System Planning and Installation Guide	PI-984A-003
J200 Remote I/O Interface (with 584 PC only)	Select One ☐	
	☐ 584 Programmable Controller Remote I/O Processing Guide	ML-584R-USE
	☐ 584 Programmable Controller Remote I/O Installation and Troubleshooting Guide	PI-584B-001
H819-103 and/or H827-103 Module Housing(s)	884 Programmable Controller System Planning and Installation Guide	PI-884A-002
J810/J812 Remote I/O Adapter	J810/J812 Remote I/O Adapter Installation and Operation Guide	PI-J810-002
	584 Programmable Controller ASCII Programming Guide	ML-A584-USE
P800 Power Supply Module	884 Programmable Controller System Planning and Installation Guide	PI-884A-002
800 Series I/O Modules	884 Programmable Controller System Planning and Installation Guide	PI-884A-002
BNC connector to F coaxial cable		
Taps and splitters		
W801 and W802 or W808 cables	884 Programmable Controller System Planning and Installation Guide	PI-884A-002

Chapter 3
System Configuration

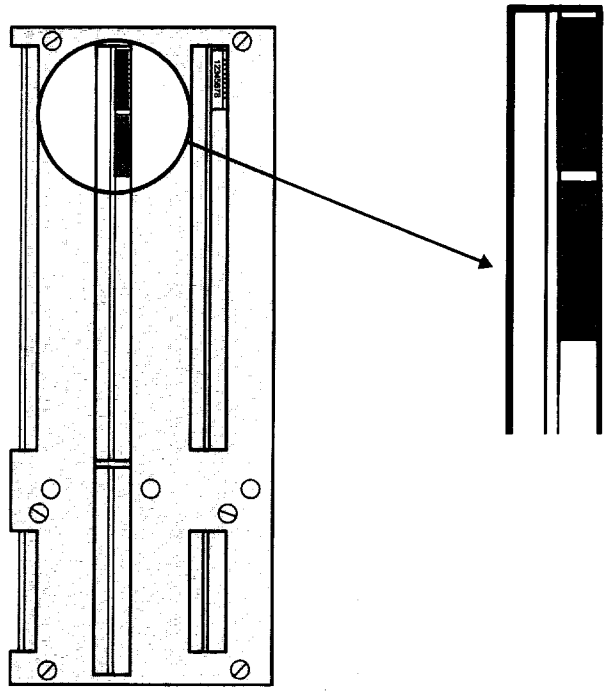
This chapter covers general configuration information and instructions along with more specific details for the type(s) of configuration chosen: standard slot and/or dense slot. A configuration procedure can be found in Appendix C. This appendix provides a summary of the instructions contained in this chapter and in Chapter 4 of this document.

The 584/800 or 984/800 remote I/O system consists primarily of the J810/J812 Adapter Module and various 800 Series I/O Modules. The physical configuration of each subsystem determines the logical configuration which needs to be identified in the 584 or 984 Traffic Cop Table for the specified channels. The mainframe housing for each subsystem must contain a power supply in the first slot. The J810/J812 Module is mounted in slots two and three in the mainframe housing, to the right of the power supply.

All I/O modules reside in slots following the adapter module and in slots of connected module housings. The physical configuration or slot number for each module is determined solely by its position in the chain of module housings. Switch settings do not determine individual slot numbers (as with 200 series I/O).

A switch setting does determine the size of the housings being used. There are two sizes of 800 Series module housings: 19-inch and 27-inch. It is important for the J810/J812 to know the size of the housing so that all slots are read. This is done by setting switch six in the bottom switchpack inside the rear panel of the J810/J812 Adapter (see Figure 3-1). To select 19-inch housings, seven slots each, flip the switch to the left; for 27-inch housings, eleven slots each, flip the switch to the right.

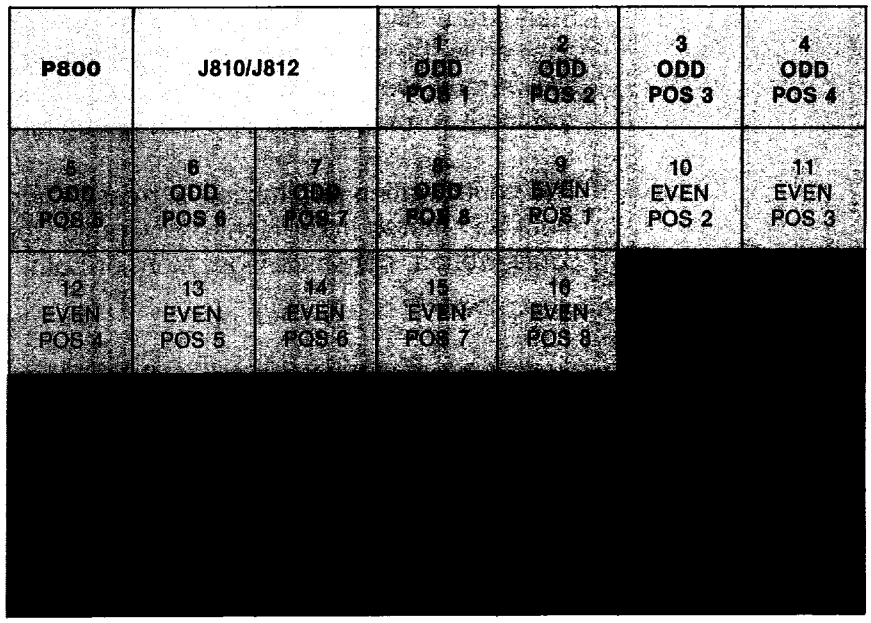
Figure 3-1
Switchpack Switches



By selecting the size of the housings, the maximum number of housings allowed in the subsystem is determined since there is a maximum configuration of 32 slots. This configuration is obtained by using all the available slots starting with rack one, slot four and numbering the slots 1 to 16 then 1 to 16 again. One set of 16 can be used for input only and

the other set of 16 for output only. Each set can then be broken into two groups of eight, one group for the odd channel and one group for the even channel. This can help you to keep track of the inputs and outputs for each channel. Figure 3-2 is a block diagram of the module addressing of 19-inch housings.

Figure 3-2.
Module Addressing Block Diagram



ODD = Odd Channel
EVEN = Even Channel
POS = Position

The module address, determined by the slot number, is not changed even if modules are inserted, removed, or replaced.

It is important to remember the following:

- Each slot can contain either an input or an output module.
- Each channel is broken up into two groups of eight positions numbered one to eight (1–8) followed by one to eight again (1–8). The first group for inputs and the second group for outputs, if desired.
- Corresponding positions for the same channel cannot contain the same module type, e.g., odd channel position 1 cannot both be input modules.
- The corresponding slot position for a bi–directional module must remain empty.
- An 8–bit input or output module counts as a full 16–bit word; the controller reads it as the low order byte of the 16–bit 984 word (bits 9–16).
- Multi–word modules must be counted differently when configuring the point maximum for the drop. The total number of points the modules control must be added together when determining the 256 point I/O maximum.

- Multi-word modules must be counted differently when configuring the point maximum. Multi-word modules are modules with more than 16 bits each and represent a number of 16-bit words. Each word, 16 bits, not just each module must be counted when determining the 256 point I/O maximum.

  Standard configuration is best for single-word modules since the I/O position is the same as the physical slot location. Dense configuration allows multi-word modules to be used without wasting housing space. A combination of standard and dense configuration is possible.

  The configuration information corresponding to the physical configuration must be entered in the controller Traffic Cop, whether using standard configuration, dense configuration, or both.

Standard Configuration

Standard configuration is used for single-word modules since the I/O position is the same as the physical slot location. This allows a visual mapping of the 584 or 984 Traffic Cop information to the housing slot location. Figure 3-2 is an example single-word standard configuration in a block format.

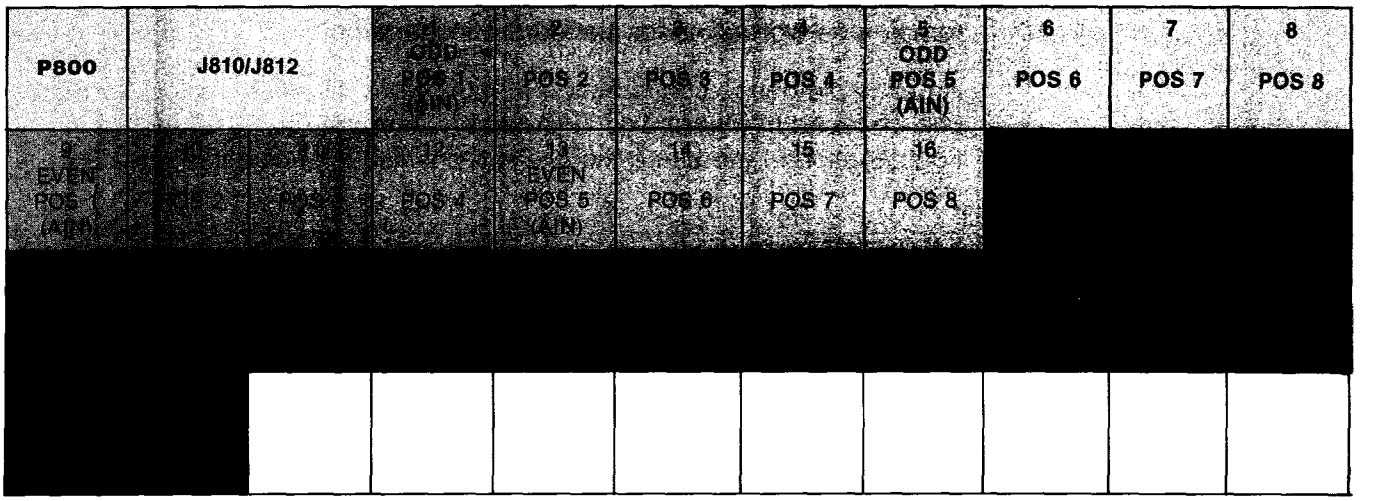
Standard configuration is selected by setting switches two to five in the bottom switchpack to the left. The switchpacks are located in the housing backplane as shown in Figure 3-1.

Multi-word modules can also be configured this way. However, you need to consider that although the module occupies only one physical slot location, the slot(s) following the module must remain empty. For example, a four-word input module occupies one physical slot but uses four positions of a channel. For this reason, the three slots following the input module must remain empty to allow for the I/O positions. The slots for this four-word input module are counted as if there are actually four one-word input modules. See Figure 3-3. Figure 3-4 is the corresponding Traffic Cop Table information.

Housing space is wasted if standard configuration is chosen with multi-word modules and it is therefore advisable to choose dense configuration (see Dense Configuration in this chapter).

If using a combination of standard and dense configuration, the standardly configured modules must follow the dense configuration.

Figure 3-3 Standard Configuration of Multi-word Modules



ODD = Odd Channel
EVEN = Even Channel
AIN = Four word, one slot analog input module
AOUT = Four word, one slot analog output module

Figure 3-4 Traffic Cop Information for Multi-word Standard Configuration

ODD CHANNEL

SLOTS	INPUTS	OUTPUTS	SLOTS
1	AIN	AOUT	9
2	↓	↓	10
3			11
4	↓	↓	12
5	AIN	AOUT	13
6	↓	↓	14
7			15
8	↓	↓	16

EVEN CHANNEL

SLOTS	INPUTS	OUTPUTS	SLOTS
1	AIN	AOUT	9
2	↓	↓	10
3			11
4	↓	↓	12
5	AIN	AOUT	13
6	↓	↓	14
7			15
8	↓	↓	16

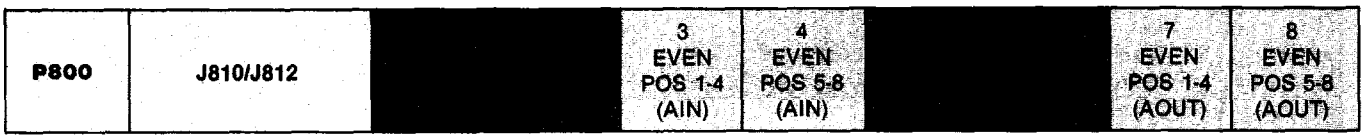
Dense Configuration

Dense configuration allows a number of multi-word modules to be used without wasting housing space. This is done by modifying the I/O numbering scheme. Each position in a channel does not need a corresponding physical slot. For example, four channel positions, represented by a multi-word module, can be assigned to one slot.

Slots one through fifteen can all be configured this way or as many slots as needed starting with slot one. The slots not allocated as dense slots remain one-word slots for standard configuration.

An example dense configuration of multi-word modules in block format can be found in Figure 3-5. This can be compared to the standard configuration of the same module types which is shown in Figure 3-3.

Figure 3-5 Dense Configuration of Multi-word Modules



ODD = Odd Channel
EVEN = Even Channel
POS = Position
AIN = four-word, one-slot analog input module
AOUT = four-word, one-slot analog output module

Figure 3-6 is the Traffic Cop Table information corresponding to the dense configuration shown in Figure 3-5.

Figure 3-6 Traffic Cop Information for Multi-word Dense Configuration

ODD CHANNEL

SLOTS	INPUTS	OUTPUTS	SLOTS
1	AIN	↓	9
2	↓	AOUT	10
3	↓	↓	11
4	↓	↓	12
5	AIN	↓	13
6	↓	AOUT	14
7	↓	↓	15
8	↓	↓	16

EVEN CHANNEL

SLOTS	INPUTS	OUTPUTS	SLOTS
1	AIN	↓	9
2	↓	AOUT	10
3	↓	↓	11
4	↓	↓	12
5	AIN	↓	13
6	↓	AOUT	14
7	↓	↓	15
8	↓	↓	16

To select dense configuration, set switches two through five in the bottom switchpack (see Figure 3-1) according to Table 3-1.

Table 3-1
Dense Configuration

Switches				Slots 1 through...
2	3	4	5	
R	L	L	L	1
L	R	L	L	2
R	R	L	L	3
L	L	R	L	4
R	L	R	L	5
L	R	R	L	6
R	R	R	L	7
L	L	L	R	8
R	L	L	R	9
L	R	L	R	10
R	R	L	R	11
L	L	R	R	12
R	L	R	R	13
L	R	R	R	14
R	R	R	R	15

R means flip the switch to the right; L is flip the switch to the left.

Switches seven and eight of the bottom switchpack must also be set when using the dense mode of configuration. These switches are used to select the density of words per physical slot. For example, if a series of 32-bit multi-word modules is being used, it is necessary to configure a density of two words for each slot.

If a mix of two-word and four-word modules is being used, the density of words per slot is two, representing the minimum density in the group. The number of dense slots needed at this density is determined by taking the total number of words and dividing it by the minimum multi-word density. For example, if a mix of three two-word and two four-word modules is used, the number of dense slots is seven:

$$\frac{(3 \text{ X } 2 \text{ words}) + (2 \text{ X } 4 \text{ words})}{\text{minimum density of } 2} = \frac{(3 \text{ X } 2) + (2 \text{ X } 4)}{2} = \frac{6 + 8}{2} = \frac{14}{2} = 7.$$

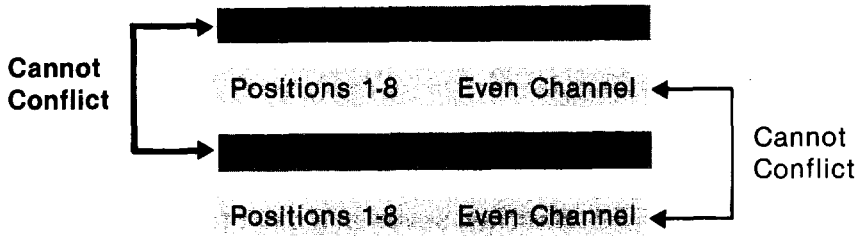
Table 3-2 contains the switch settings for density and Table 3-1 contains the switch settings for the number of dense slots.

Table 3-2
Density Switch Selections

Switches		Words per Slot
7	8	
L	L	2
R	L	4
L	R	8
R	R	16

It is important to remember when using dense configuration that the position numbers within a channel cooperate. For example, if a two-word output module is assigned position one in an odd channel, the other position one in the same channel cannot also have an output module assigned to it. See Figure 3-7.

Figure 3-7
Position Cooperation



In the same way, an even channel's position three cannot have two input modules assigned to it; it can have an input module assigned to one position three and an output module assigned to the other position three.

It is possible to have an output module in position two of an odd channel and position two of the corresponding even channel.

Chapter 4
Installation

This chapter provides instructions for installing a J810/J812 Remote I/O Adapter and making the appropriate cable connections. For information regarding 584 PC installation and the remote I/O system consult the following:

- 584 Programmable Controller System Planning and Installation Guide
- 584 Programmable Controller Remote I/O Processing Manual
- 584 Programmable Controller Remote I/O Installation and Troubleshooting Guide

984 installation instructions can be found in the *984 Programmable Controller System Planning and Installation Guide*. Installation instructions for the 800 Series I/O Modules and Housings can be found in the *884 Programmable Controller System Planning and Installation Guide.*

The J810/J812 Remote I/O Adapter is inserted into the second slot in the mainframe housing, to the right of the P800 Power Supply. Before inserting the adapter, it is necessary to set the switches inside the back of the J810/J812.

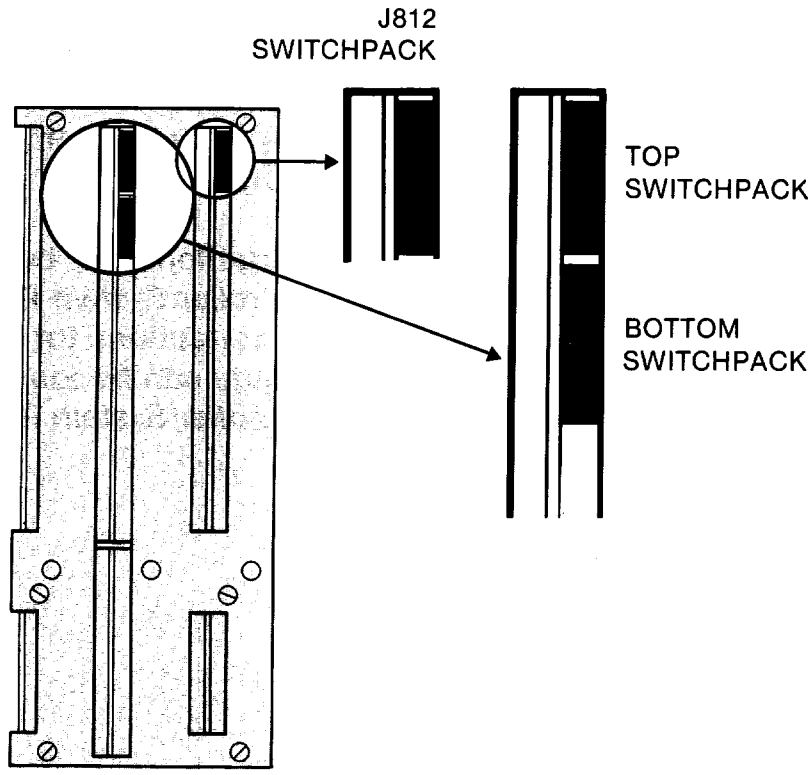
► **CAUTION Power *must* be *OFF* when inserting or removing the J810/J812 Adapter.**

Switchpack Switches

There are two switchpacks located inside the back of every J810 and J812 Adapter. The top switchpack is used to set the J810/J812 configuration and drop address as outlined in Drop Address in this chapter. The bottom switchpack is used to set the I/O configuration as outlined in Dense Configuration in Chapter 3.

The J812 also has a third switchpack located inside the rear panel. This switchpack is used to set the address and configuration of the communication devices attached to the J812. See Figure 4-1.

Figure 4-1
Switchpack Switches



All switch settings are referred to as "to the left", "L", or "to the right", "R", left being off and right being on.

Tables 4-1 and 4-2 outline the assignments of each of the switches common to both the J810 and J812, with Table 4-1 covering the top switchpack and Table 4-2 covering the bottom switchpack. Table 4-3 outlines the switch assignments for the J812 communication switchpack.

Table 4-1
Top Switchpack Assignments

Switch Number	Description
1	Not Used. Keep to the Left.
2 3 4 5	Drop Address See Table 4-4.
6	584 or 984 Communications Timeout L = 300 milliseconds R = 1200 milliseconds
7	Confidence Test Mode L = Normal R = Repeat or Single Step (See Confidence Tests in Chapter 5)
8	Not Used. Keep to the Left.

Table 4-2
Bottom Switchpack Assignments

Switch Number	Description
1	Not Used. Keep to the Left.
2 3 4 5	Dense Configuration See Table 3-1.
6	Housing Size L = 19-inch R = 27-inch
7 8	Density of Words See Table 3-2.

Table 4-3
J812 Communication
Switchpack Assignments

Switch Number	Description
1	RS-232-C Handshake for Bottom Port L = Data Terminal Ready R = X on/X off
2	RS-232-C Handshake for Top Port L = Data Terminal Ready R = X on/X off
3 4 5 6	Communication Port Address See Table 4-5.
7	Continuous Confidence Test Mode L = Local Diagnostic R = On-Line
8	Not Used. Keep to the Left.

Drop Address The drop address is set by setting switches two through five in the top switchpack according to Table 4-4. The drop address refers to the channels of I/O. For example, the third drop, set as L R L L, represents the drop address for channels five and six.

Table 4-4
Drop Address Switch Settings

Switches				Drop Number	Drop Address
2	3	4	5		Channels
L	L	L	L	1	1, 2
R	L	L	L	2	3, 4
L	R	L	L	3	5, 6
R	R	L	L	4	7, 8
L	L	R	L	5	9, 10
R	L	R	L	6	11, 12
L	R	R	L	7	13, 14
R	R	R	L	8	15, 16
L	L	L	R	9	17, 18
R	L	L	R	10	19, 20
L	R	L	R	11	21, 22
R	R	L	R	12	23, 24
L	L	R	R	13	25, 26
R	L	R	R	14	27, 28
L	R	R	R	15	29, 30
R	R	R	R	16	31, 32

Communication Port Address The communication port address is set by setting switches three through six in the communication port address switchpack in the J812 (see Table 4-5). This address is used to identify the communication ports on the J812. Each J812 Adapter is given a different pair of port addresses to identify which adapter messages are sent to or from.

Table 4-5
Communication Port Address Switch Settings

Switches				Communication Address
3	4	5	6	Ports
R	R	R	R	1, 2
L	R	R	R	3, 4
R	L	R	R	5, 6
L	L	R	R	7, 8
R	R	L	R	9, 10
L	R	L	R	11, 12
R	L	L	R	13, 14
L	L	L	R	15, 16
R	R	R	L	17, 18
L	R	R	L	19, 20
R	L	R	L	21, 22
L	L	R	L	23, 24
R	R	L	L	25, 26
L	R	L	L	27, 28
R	L	L	L	29, 30
L	L	L	L	31, 32

LED/Error Indicators

The front panel of the J810 Remote I/O Adapter has six LED's as shown in Figure 4-2. The J812 has these indicators plus four others to indicate peripheral communication status as shown in Figure 4-3.

Figure 4-2
J810 Front Panel LED's

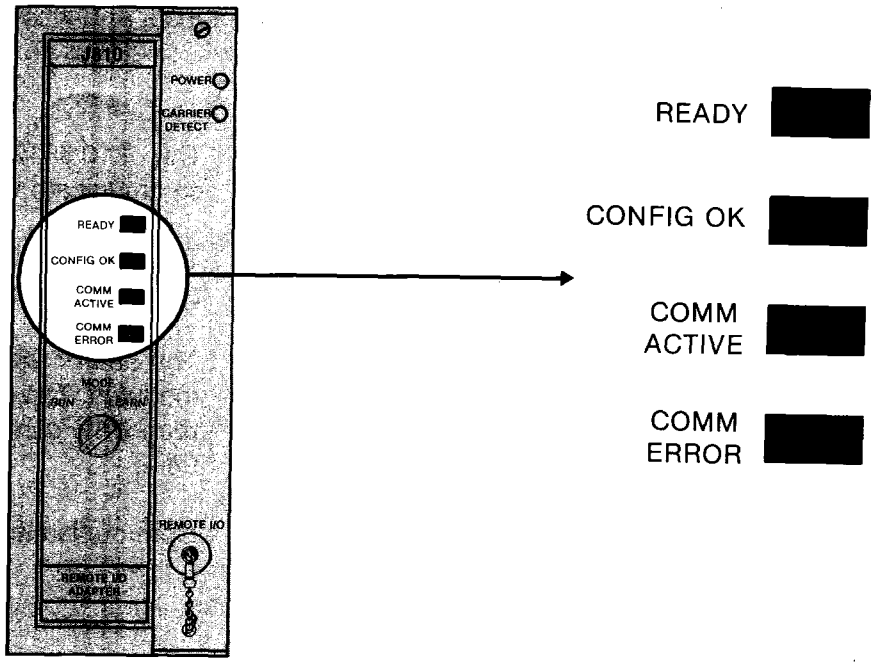
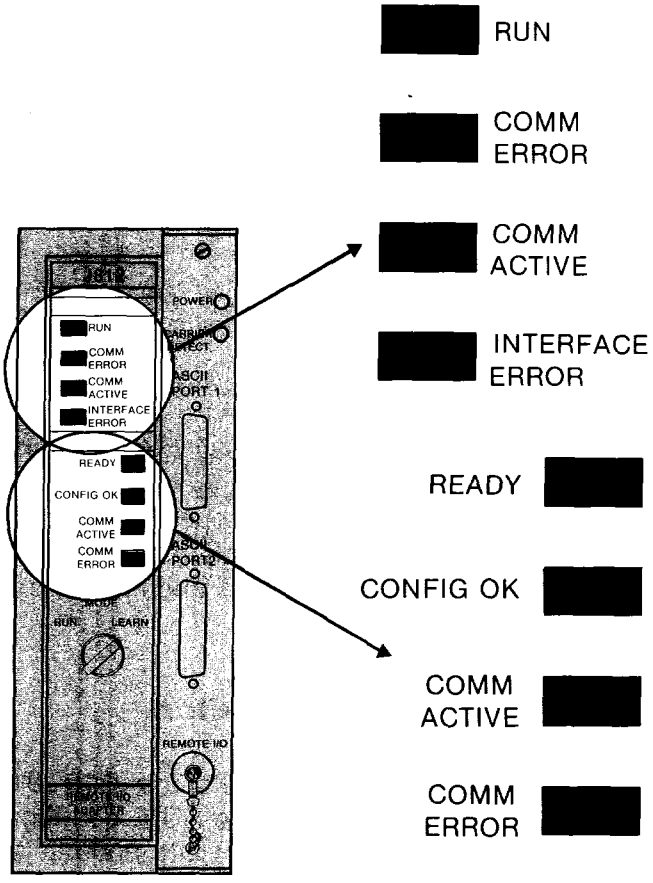


Figure 4-3
J812 Front Panel LED's



The following is a list of the LED's and what they indicate when ON:

584/984 Communications

READY	The J810/J812 is healthy and ready to communicate with the 584 or 984.
CONFIG OK	The J810/J812 configuration completed successfully.
COMM ACTIVE	The 584 or 984 is controlling the I/O modules. The J810/J812 is receiving read/write commands from the 584 or 984.
COMM ERROR	Communications error.

J812 ASCII Communications

RUN	ASCII CPU and memory are healthy.
COMM ERROR	584 or 984 communication error.
COMM ACTIVE	Communication activity with the 584 or 984.
INTERFACE ERROR	Serial port interface error.

Power Supply

POWER	Power received by J810/J812.

Modem

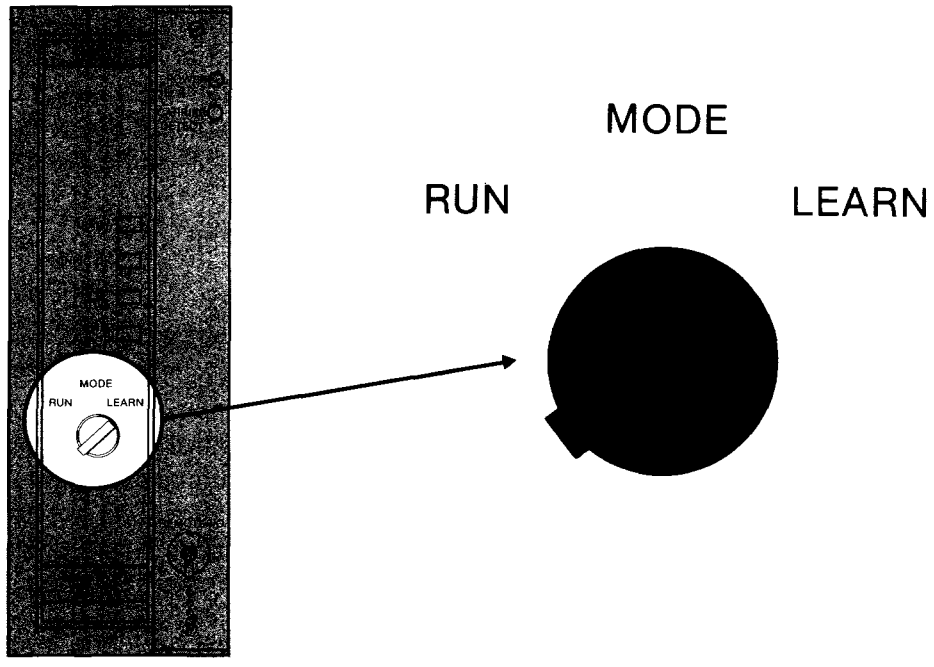
CARRIER DETECT	The modem is ready, receiving messages.

Four of these LED's, the 584/984 communications LED's, are also used to indicate confidence test errors. Upon detecting an error, the J810/J812 ceases normal operation then flashes a combination of the four LED's to indicate which test detected the error. Appendix A covers all the possible error codes and their definitions.

Front Panel Keyswitch

Located on the front panel of the J810/J812 is a two-position keyswitch with the labels LEARN and RUN. See Figure 4-4. This keyswitch is used to select either LEARN or RUN mode. It is also used to select repeat or single step test mode if test mode is chosen using switch seven in the top switchpack (see Chapter 5).

Figure 4-4
Front Panel Keyswitch



►► **WARNING When in LEARN mode, the J810/J812 writes zeros to all output modules. Equipment which is sensitive to zero data should be disconnected prior to switching to LEARN mode.**

The LEARN mode should be selected upon the initial power-up of a system, when changes have been made to any of the switchpack switches, and/or when I/O module changes have been made.

When the keyswitch is turned to LEARN, all the 800 Series I/O modules present are scanned. The J810/J812 reads the module type and size, validating the physical I/O configuration. The adapter learns the current configuration from the switchpacks as well.

The J810/J812 Adapter maintains communications with the 584 or 984 Controller but does not control the I/O modules with 584 or 984 data. The J810/J812 Adapter also reports bad health for all module slots.

If the configuration is valid, the CONFIG OK LED is on. If the CONFIG OK LED does not come on, one or more modules are in conflicting positions. A quick examination of MODULE ACTIVE lights determines which modules, if any, are conflicting. The MODULE ACTIVE light on a module is off if the module is conflicting and flashing on all non-conflicting modules.

After the configuration has been learned and validated, place the keyswitch in the RUN position. The 584 or 984 Controller is now controlling the 800 Series I/O

► **NOTE** If any changes are made in the switchpacks or if any I/O modules have been replaced or moved, it is *very important* that the keyswitch be placed in the LEARN position until the configuration is learned and validated. If this is not done, the changes are not acknowledged; it is assumed that the previous configuration is still relevant and it is still used.

Cable Connections

The 584 Programmable Controller is connected to the J200 Remote I/O Interface via the cable that comes with the J200. The J200 Interface is connected to its remote I/O drops via a coaxial cable. In this case, a BNC to F coaxial cable is used. This same type cable is used to connect the 984 PC directly to its remote I/O drops.

Appropriate connections must be made from the coaxial cable using taps and splitters to connect it to the BNC connector on the J810/J812's front panel (see Figure 4-5). A graphic representation of these connections can be found in Figures 2-1 and 2-2 in Chapter 2.

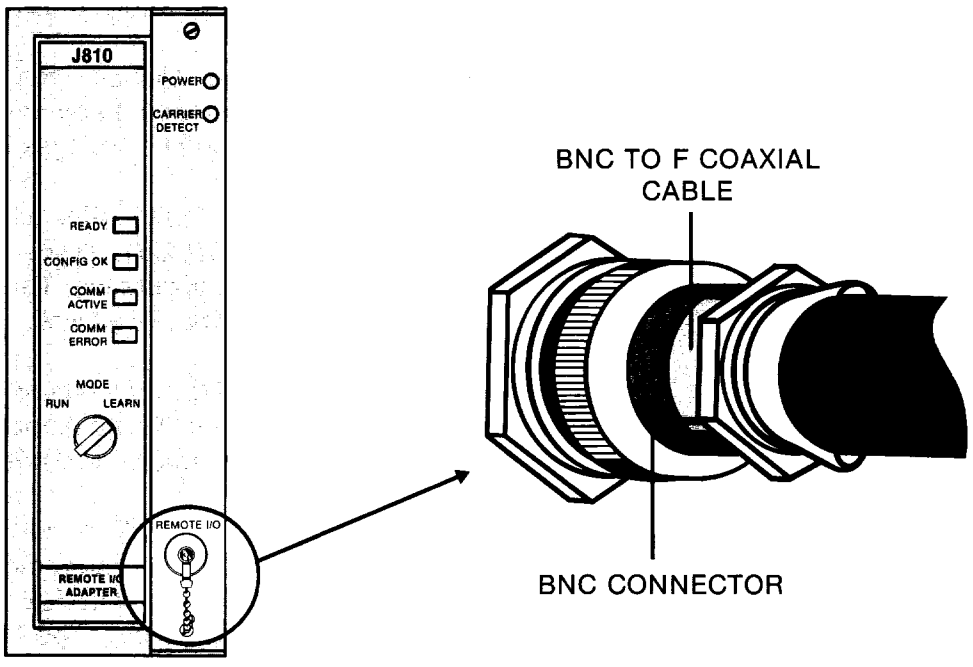


Figure 4-5
Front Panel BNC Connector

Peripheral devices can be connected to ports 1 and 2 on the J812 front panel. These RS-232-C ports have the following pinouts:

Pin	Signal Name
1	Protective (earth) Ground
2	Transmit Data
3	Receive Data
4	Request to Send
5	Clear to Send
6	Data Set Ready
7	Signal Ground
20	Data Terminal Ready

The module housings themselves are interconnected by an AS-W801-0XX cable and an AS-W802-0XX or AS-W808-00X cable. The W801 cable is a 37-pin flat bus signal cable and the W802 and W808 cables are 15-pin power cables. The W801 and W802 cables come in one foot, six foot, and twelve foot lengths and the W808 cable comes in 1.5 foot and five foot lengths. For specific installation instructions, see the *884 Programmable Controller System Planning and Installation Guide.*

Chapter 5
Confidence Tests

This chapter describes the various tests which the J810/J812 Remote I/O Adapter is capable of performing. These tests include the power-up confidence test, the on-line confidence tests, and the repeat and single-step test mode confidence tests. If any of the tests fail, an error code is flashed in the LED's. The error codes are given in Appendix A.

Power-up Confidence Test

The main purpose of the power-up confidence test is checking the J810/J812 hardware to determine whether or not the adapter is ready for proper operation. Included in this test are the following, in order of execution:

1 LED test
2 PROM test
3 RAM data test
4 Digital loop test
5 Analog loop test
6 Switched RAM test
7 RAM address test
8 Switchpack present test
9 EEPROM test
10 Port test
11 Interrupt test
12 Real time clock test

If all the tests pass, the READY LED comes on and operations can proceed. If an error is detected, the power-up confidence test retains control, thereby preventing the use of defective equipment. The appropriate error code is flashed in the LED's (see Appendix A) and a power reset is required to restart.

Confidence Tests

Following the power-up confidence test, there are two selectable tests and the on-line confidence tests. With switch seven in the top switchpack set to the left and the LEARN/RUN keyswitch in the RUN position, only the on-line confidence tests are performed. The repeat or single-step test modes of the confidence tests are selected by setting switch seven in the top switchpack to the right.

On-line Confidence Tests

The on-line confidence tests detect hardware failures in a running system. These tests are important since, without them, a hardware failure occurring after power-up could go undetected and influence system operation. This is especially important if a system is running for several months without being shut off and restarted.

The on-line confidence tests consist of the following:

- RAM data and address tests
- PROM test
- EEPROM test
- Switched RAM tests
- Switchpack image test
- Clock ticking test
- Modem Watchdog test

If an error is detected, the LED's flash the appropriate error code, the J810/J812 Adapter ceases operation, and all outputs are driven to the safe state.

Test Modes

The confidence tests can be invoked in either of two test modes. These tests are used primarily for bench testing or intermittent troubleshooting. If a test mode is selected, the tests are executed in the following order:

	LED test (once initially)
1	PROM test
2	Switched RAM tests
3	RAM data and address tests
4	EEPROM test
5	Switchpack image test
6	Modem Watchdog
7	Port test
8	Switchpack present test
9	Interrupt test
10	Real time clock test
11	Digital loop test
12	Analog loop test

The test modes are controlled by switch seven in the top switchpack and by the J810/J812's front panel LEARN/RUN keyswitch.

Repeat Test Mode Repeat test mode allows the confidence tests to be executed repeatedly in sequence. If all the tests pass, the tests are executed again in sequence. If an error is detected, the LED's flash the appropriate error code.

To select this test mode, set switch seven in the top switchpack to the right and place the LEARN/RUN keyswitch in the RUN position for power-up.

Single-Step Test Mode Unlike repeat test mode, single-step test mode must be prompted to execute the next sequential test. In single-step test mode, the confidence tests are executed in sequence yet each individual test is repeated until the LEARN/RUN keyswitch is either changed from LEARN to RUN or from RUN to LEARN. At this point, the next test in the sequence is performed until the keyswitch is changed again.

To select single-step test mode, set switch seven in the top switchpack to the right and place the LEARN/RUN keyswitch in the LEARN position initially.

Appendix A
Error Codes

If an error is detected in any of the confidence tests, an error code flashes in the four LED's on the front panel of the J810/J812 Adapter (see Figure A-1). This appendix contains a graphic representation of the tests and the error codes (see Figure A-2).

A power reset is required to restart the J810/J812. If this fails to correct the error, replace the J810/J812 Adapter.

Figure A-1
LED/Error Indicators

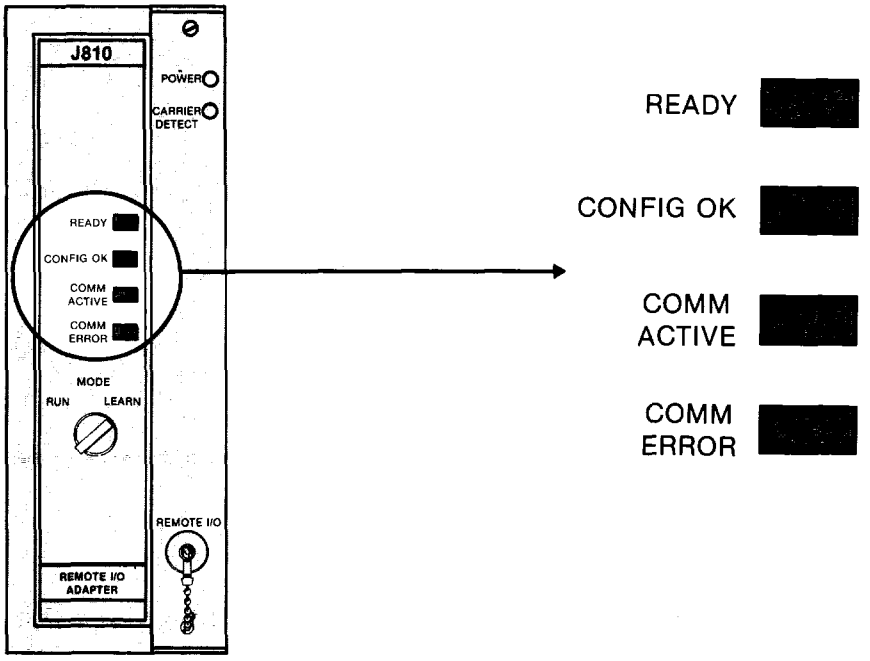
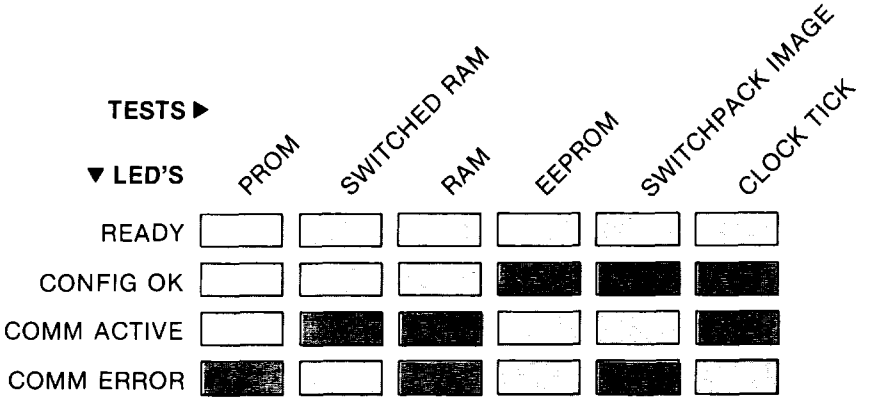
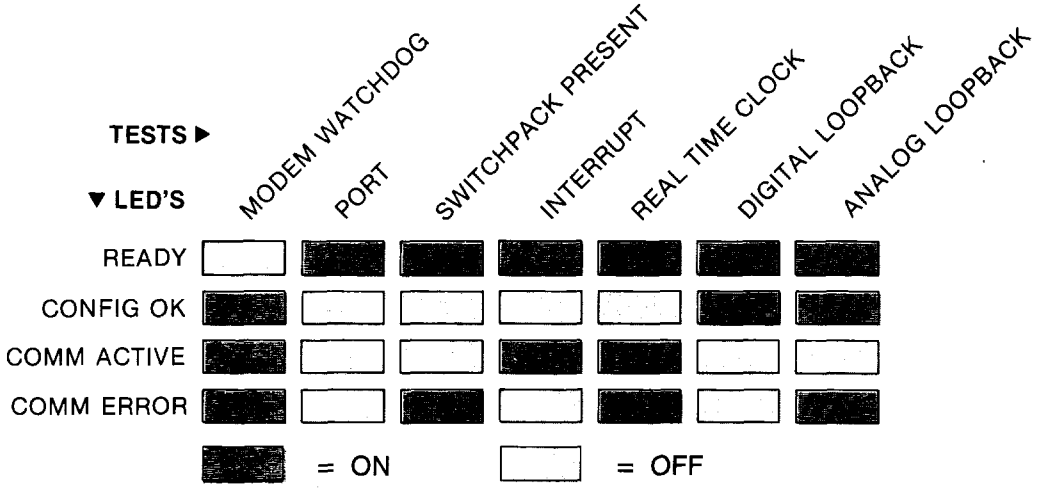


Figure A-2
Test Error Codes





Appendix B
Specifications

HUMIDITY	0 - 95% non-condensing
SHOCK	10 G, peak 1/2 sine
VIBRATION	.005 in. D.A., sine from 5 - 50 Hz .625 G, sine from 50 - 500 Hz
DIMENSIONS (W x H x D)	3.53 in. x 10.47 in. x 8.25 in. (8.97 cm. x 26.59 cm. x 20.95 cm.)
WEIGHT	5 lbs. (2.25 kg.)
OPERATING TEMPERATURE	0° to 60° C
POWER REQUIREMENTS	From the P800-003 Power Supply
Voltage	Current
+5	5000 mAmps (J810) 7250 mAmps (J812)
−5	100 mAmps
+12	100 mAmps
−12	75 mAmps

Appendix C
Configuration Procedure

When setting up your 584/800 or 984/800 Remote I/O System, your 584 or 984 Programmable Controller must be configured following the standard configuration guidelines. Your J810/J812 Remote I/O Adapter must be configured also. This is done by setting the appropriate switches in the back of the J810/J812 and by following the guidelines in Chapters 3 and 4 of this guide.

The following procedure is designed to help you set up your configuration. For details not contained here, reference the appropriate chapter of this guide.

Step 1 Determine the types of modules being used and the number of modules. Keep in mind the maximum number of 256 input points and 256 output points.

Also, determine the size of the housings being used. Set switch six in the bottom switchpack to the left for 19-inch housings and to the right for 27-inch housings.

Step 2 Starting with a blank block diagram of your available I/O slot locations, map out your I/O modules. Fill in the slots on the block diagram, checking for conflicting inputs and/or outputs. Follow the rules in Chapter 3 of this document.

Step 3 Select the type(s) of configuration being used. If using a combination of standard and dense configuration, determine the number of dense slots needed and set switches two through five in the bottom switchpack according to Table 3-1.

Step 4 Determine the density of words per slot and set switches seven and eight in the bottom switchpack according to Table 3-2.

Step 5 Determine the drop number/address of your J810/J812 Adapter and I/O. The drop number represents the position of your J810/J812 system in the line communicating with a particular 584 or 984 Controller. The drop address refers to the I/O channels corresponding to a drop number. For example, channels one and two are at drop number one. Set switches two through five in the top switchpack according to Table 4-4.

Step 6 Select a 584 or 984 communications timeout of either 300 or 1200 milliseconds. Set switch six in the top switchpack to the left for 300 milliseconds or to the right for 1200 milliseconds.

Step 7 Select the confidence test mode using switch seven in the top switchpack. Set the switch to the left for normal confidence test mode. For repeat or single-step test mode, set the switch to the right.

The front panel keyswitch is used to correctly operate the repeat and single-step test modes. See Chapter 5.

Step 8 Select the RS-232-C handshake for each communication port. Set switch one in the J812 switchpack for the bottom communication port and switch two for the top port. Setting either switch to the left is for Data Terminal Ready (DTR) and to the right is for X on/X off.

Step 9 Determine the communication drop address of your J812 Remote I/O Adapter. This address is used to identify the communication ports on the J812, thereby allowing you to determine which adapter messages are sent to or from. To select a communication port address, set switches three through six in the J812 communication switchpack according to Table 4-5.

Step 10 Select the continuous confidence test mode. Set switch seven in the J812 switchpack to the left for local diagnostic test mode and to the right for on-line test mode.

Step 11 Set switches one and eight in the top switchpack, switch one in the bottom switchpack, and switch eight in the J812 switchpack to the left.

Step 12 Insert the J810/J812 Remote I/O Adapter firmly into the mainframe housing in the slot to the immediate right of the power supply.

Step 13 Turn the front panel keyswitch to the LEARN position for power-up.

Step 14 Power-up the system and allow the J810/J812 Adapter to learn the configuration.

Step 15 Turn the front panel keyswitch to the RUN position.

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